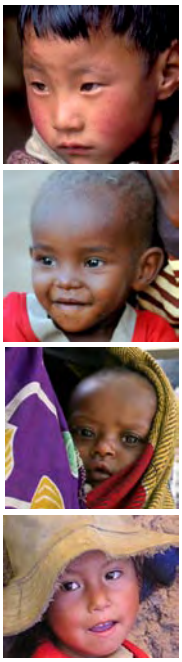
A Review of the Evidence



How Effective Is Community-Based Primary Health Care in Improving the Health of Children?

Summary Findings
Report to the Expert Review Panel

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Photographs courtesy of Future Generations and World Vision
Design by Traci Hickson of Future Generations

Acknowledgements

We, as members of the Task Force on the Effectiveness of Community-Based Primary Health Care of the International Health Section of the American Public Health Association, express our appreciation to the Department of Child and Adolescent Health and Development of the World Health Organization, UNICEF, the World Bank, Future Generations Graduate School, and the CORE Group/USAID for the financial support which made this review possible. The American Public Health Association generously administered the funds received to carry out this project. We express our gratitude to the following people at APHA for their support and collaboration: Ms. Charlene Bright, Senior Administrative Assistant, Center for Learning and Global Public Health; Dr. Barbara Hatcher, Director, Center for Learning and Global Public Health; Ms. Kemi Oluwafemi, Chief Financial Officer; Mr. Alan Baker, Chief of Staff; and Dr. Georges Benjamin, Executive Director.

In addition, we thank Dr. Robert Black of the Bloomberg School of Public Health, Johns Hopkins University, for his support and encouragement. We also thank Dr. Carl Taylor of the Bloomberg School of Public Health and the Future Generations Graduate School for his guidance and fleadership as Chair of the Expert Review Panel for the study. Finally, we would like to single out Dr. Rudolph Knippenberg for championing this review with UNICEF, WHO, and the World Bank. We also express our gratitude to Dr. Agnes Soucat of the World Bank and Dr. Jose Martines of the World Health Organization for their strong interest and support. We are grateful to individual members of the Expert Panel for their comments on earlier versions of this report, especially Abhay Bang, Zulfiqar Bhutta, Bob Black, David Sanders, Carl Taylor, Cesar Victora, and Zonghan Zhu.

Many of the collaborators in the activities of this Task Force worked as volunteers, and we express our appreciation to them for their interest in and support of this review. We express our appreciation to the World Bank for the support of two of its public health consultants: Dr. Bahie Mary Rassekh served as a Study Coordinator for the Task Force, and Dr. Mona Sharan provided assistance with literature reviews and editing. We thank UNICEF for the assistance of Dr. Mariame Sylla, Health Programme Specialist, in locating articles and documents and in serving as a reviewer. We also thank Dr. Asha George of UNICEF for her assistance in reviewing drafts of reports. We are grateful to Nirali Shah for her assistance in identifying and reviewing studies of micro-finance and child health, Robert Steinglass of Immunization BASICS for his review of earlier drafts and his assistance related to issues regarding immunizations and child health, to Gary Darmstadt for his review of the section on neonatal health, and to Robert Quick for his review of the section on childhood diarrhea. We thank Traci Hickson of Future Generations and Olga Wollinka for editorial support.

Last, but not least, we express appreciation to the Future Generations Graduate School and Dr. Daniel Taylor, President. The Future Generations Graduate School has an endowed professorship, the Carl Taylor Professorship for Equity and Empowerment, which Dr. Perry has occupied for six years, since 2003. Without this support and the community-oriented focus of Future Generations and its leadership, this review would not have been possible.

Executive Summary

Excitement is rapidly growing concerning the potential for community-based primary health care (CBPHC) to accelerate progress in reducing the tragedy of millions of children dying world-wide each year from readily preventable or treatable conditions. Consequently, a review of the evidence concerning the effectiveness of community-based approaches is timely. This report to the Expert Panel attempts to summarize the current research findings concerning the effectiveness of CBPHC in improving the health of children in high-mortality, resource-poor settings.

The review covers much – but not all – of what is known at present about community-based approaches to improve the nutritional status of children; to improve perinatal and neonatal health; to prevent and treat childhood pneumonia, diarrhea and malaria; to expand coverage of immunizations; to promote handwashing and family planning; to prevent mother-to-child transmission of HIV infection; and to improve child health through non-health interventions. The review also covers major programmatic achievements in child health during the past 25 years, cross-cutting themes (such as community health workers, equity issues, health system issues, and the broader social determinants of health), and current and emerging programmatic approaches.

The full documentation of the review's findings is still in preparation and will be published as a supplement to the *Journal of Health, Population and Nutrition* and as a monograph. In addition, several summary articles will soon be submitted to high-profile journals. Drafts of these documents are available to the Expert Panel for its review but have not yet been made publicly available. What follows is a general summary of the findings with recommendations.

The review reaffirms that the following interventions and approaches are effective and should receive priority in programming of community-based interventions:

- BCG, polio, diphtheria, pertussis, tetanus, measles, Haemophilus Influenza Type b (Hib), pneumococcus, and rotavirus immunizations for children and tetanus immunization for mothers and women of reproductive age
- Provision of supplemental vitamin A to children 6-59 months of age and to post-partum mothers
- Provision of preventive zinc supplements to all children 6-59 months of age
- Promotion of breastfeeding immediately after birth, exclusive breastfeeding during the first 6 months of life, and continued breastfeeding after 6 months of age
- Promotion of appropriate complementary feeding beginning at 6 months of age
- Promotion of hygiene (including handwashing), safe water, and sanitation
- Promotion of oral rehydration therapy (ORT) and zinc supplementation for children with diarrhea
- Promotion of clean delivery, especially in settings in which most births occur at home and hygiene is poor
- Community-based treatment of childhood pneumonia
- Home-based neonatal care, which includes promotion of immediate and exclusive breastfeeding, promotion of cleanliness, prevention of hypothermia, and diagnosis and treatment of neonatal sepsis by Community Health Workers (CHWs)

- Community-based rehabilitation of children with protein-calorie malnutrition through provision of food supplementation (including rehabilitation of children with severe acute malnutrition through the provision of ready-to-use dry therapeutic foods)
- Insecticide-treated bednets (ITNs) in malaria-endemic areas
- Indoor residual spraying in malaria-endemic areas
- Community-based treatment of malaria
- Intermittent preventive treatment during pregnancy (IPTp) of malaria in malaria-endemic areas
- Intermittent preventive treatment during infancy (IPTi) of malaria in malaria-endemic areas
- Detection and treatment of syphilis in pregnant women in areas of high prevalence
- Prevention of mother-to-child transmission (PMTCT) of HIV infection
- Iodine supplementation in iodine-deficient areas where fortified salt is not consumed

All of these interventions cannot be immediately implemented in high-mortality, resource-constrained settings. Policy makers, program managers, and donors will have to make judgments regarding which interventions have the most promise for mortality reduction given the epidemiological, health system, and socio-cultural factors in a given setting.

There is some evidence that the following community-based interventions can be effective in improving child health, but further evidence is needed in a greater variety of field settings. These include:

- Community-based rehabilitation of children with protein-calorie malnutrition through the Positive Deviance/Hearth approach
- Provision of prenatal calcium in calcium-deficient populations for prevention of pre-eclampsia and eclampsia
- Detection and treatment of asymptomatic bacteriuria
- Application of a topical antiseptic to the umbilical cord of neonates
- Skin cleansing of newborns with a topical antiseptic soon after birth
- Improved airway management and resuscitation in neonates by appropriately trained CHWs
- Reduction of household smoke by placement of improved cooking stoves (to reduce childhood pneumonia)

The following interventions have evidence of effectiveness in improving child health along with evidence of having other important benefits beyond child health:

- Participatory women's groups for empowerment and education about maternal and neonatal health issues
- Micro-credit programs for women, conditional cash transfers to women (in which poor women receive cash transfers with the condition that they obtain certain health services), and education of girls

For interventions that have a strong scientific basis of effectiveness, the challenge now is to implement these at scale, either individually or in carefully designed combinations. Ongoing rigorous external and independent assessments are needed to judge effectiveness and to make adjustments in implementation as the scale of implementation expands.

The forthcoming journal supplement and monograph provide descriptions of a number of highly successful CBPHC programs that have implemented integrated approaches in an effective and affordable manner with demonstrable benefits on under-5 mortality, while concurrently producing other major health and non-health benefits beyond improvements in child health. These broader approaches deserve support for expanded implementation while also undergoing rigorous evaluation.

New methods for assessing impact are needed to further strengthen routine programming at scale. The widespread application of the findings of mortality impact assessments at scale in high-mortality, resource-poor settings coupled with careful ongoing monitoring of the quality, coverage and mortality impact of services with adjustments in programming based on this monitoring has the potential to spark a second revolution in maternal, neonatal and child health. The widespread application of this knowledge should accelerate progress in reaching Millennium Development Goal 4 of reducing under-5 mortality by two-thirds. This review confirms UNICEF's view that "there is more than enough information to act" (UNICEF, 2008a). Now is the time for bold action.

Introduction

Remarkable progress has been made globally in reducing child deaths during the past 50 years; the number of children dying annually before age 5 has declined from 18.9 million in 1960 to 9.2 million at present despite the fact that the annual number of births has increased from 96 million in 1960 to 135 million in 2007 (Ahmad et al., 2000; Black et al., 2003; UNICEF, 2008a). However, the great majority of the deaths that still occur are caused by readily preventable or treatable conditions. Furthermore, the dramatic global disparities in the health status of children are increasing rather than declining, and many countries around the world – especially in Africa – are not on track to achieve Millennium Development Goal (MDG) number 4, which calls for a two-thirds reduction by the year 2015 in the mortality of children aged less than 5 years based on 1990 levels (United Nations, 2000).

There is a growing recognition that programs which reach beyond the walls of health care facilities and which involve the community as partners have a great potential for further reducing under-5 mortality at minimal cost. There are inspiring examples of where this has occurred both in small-scale, short-term pilot projects as well as in larger-scale ongoing programs. The number of recent studies demonstrating the potential of this approach is growing, and interest in community-based primary health care (CBPHC) is on the rise. Recent reviews have highlighted this evidence (Bhutta et al., 2008a; Bhutta et al. 2008b; Bhutta et al., 2005; Darmstadt et al., 2005; Hill et al., 2004; Jones et al., 2003). However, the role of the community as a partner in these programs has been given much less attention, as has the manner in which these proven interventions have been successfully implemented at the community level.

One recent review was an important step in this direction (Rosato et al., 2008), but it provided a broad overview rather than a detailed assessment. Therefore, a thorough understanding regarding what has been achieved so far through these approaches is still lacking. Awareness about the potential of CBPHC is still not broadly shared in the global health community.

This review provides documentation that strengthening CBPHC has the potential to accelerate progress in reaching the MDGs in health. CBPHC also has the potential for providing another entry point for building more cost-effective comprehensive primary health care programs that meet the needs and expectations of local people. Summarizing what works will facilitate systematic sharing of good practices, a priority task in this era of rapidly growing interest in reducing global health disparities and reaching communities with effective programs (UNICEF, 2008a). The present document summarizes the findings for the Expert Panel, which has been convened to guide the review. The Expert Panel will draw conclusions about the findings and suggest next steps in research, policy, and program implementation.

Goals of the Review

The goal of the review was to describe what has been achieved through community-based approaches for improving child health, to assess the potential of CBPHC for improving child health, and to identify gaps in our knowledge. The specific questions addressed by the review were:

- How strong is the evidence that CBPHC can improve the health of children at the population level and sustain that improvement?
- What specific CBPHC activities improve child health, as defined by reductions in mortality and serious morbidity, improvements in nutritional status, and increased coverage of key child survival activities?
- What conditions (including those within the local health system itself) facilitate the effectiveness of CBPHC and what community-based approaches appear to be most effective?
- What characteristics do effective CBPHC activities share?
- What program elements are correlated with improvements in child health?
- How strong is the evidence that partnerships between communities and health systems are required in order to improve child health?
- How strong is the evidence that CBPHC can be cost-effective?
- How strong is the evidence that CBPHC can promote equity?
- What general lessons can be drawn from both successful and unsuccessful experiences?
- What additional research is needed?
- How can successful community-based approaches for improving child health be scaled up to regional and national levels within the context of severe financial and human resource constraints?
- What are the implications for regional, national, and global health policy; for program implementation; and for donors?

The forthcoming journal supplement and monograph will summarize the documented and evaluated CBPHC activities to: improve child nutrition and perinatal/neonatal health; prevent, diagnose, and treat childhood pneumonia, diarrhea, and malaria; expand coverage of immunization programs; prevent the mother-to-child transmission of HIV infection; promote family planning, and; improve child health through non-health interventions such as conditional cash transfers, micro-credit, and education. These documents will also examine the effectiveness of integrated programs, summarize the programmatic achievements of CBPHC in a variety of settings, examine cross-cutting themes, and highlight established as well as emerging community-based approaches effective in improving child health.

Methods

Definition of CBPHC

For the purposes of this review, we defined CBPHC as an activity that (1) is intended to improve health and has a well-documented direct or indirect influence on health, and (2) does not take place exclusively in a health facility. Our broad definition of CBPHC includes both highly selective as well as comprehensive approaches. CBPHC activities do not necessarily have to involve the community in planning, implementation or evaluation, and they may include communications, social mobilization, community activities, and broader development activities which influence health.

Identification of Articles and Other Documents for the Review

The Task Force carried out a literature search for articles. The principal inclusion criteria were (1) the program managers or researchers implemented one or more interventions using a CBPHC approach and (2) they carried out either a direct assessment of child health status or an indirect assessment of child health status by evaluating a process or outcome known to be closely associated with child health status. In general, our focus has been reviewing the effectiveness of program interventions on the health of geographically defined populations of children during their first five years of life.

Direct assessments of child health that qualified for the review included those with community-based interventions in which outcome measures were mortality, serious morbidity, or nutritional status. The indirect assessments of child health that qualified for the review included those with community-based interventions to promote behaviors or utilization of health services which are closely linked to child health. These interventions are included in the two Lancet series in 2003 and 2005 on child survival and neonatal health (Darmstadt et al., 2005, Jones et al., 2003). These interventions can all be provided through a CBPHC approach and have been strongly linked to improvements in child mortality.

Key terms for "community health," "child health," and "developing countries" were identified in the US National Library of Medicine's PubMed database, yielding 3,224 articles, which were assessed to determine if they met the criteria for inclusion in the review. The articles were screened by reviewing the abstract or, if necessary, the full texts. The annual reviews of Randomised Trials in Child Health in Developing Countries[1] for the years 2002-2008 were also reviewed. Articles describing the findings from a review of the literature were further included if the topic was appropriate. In addition to this, broadcasts were sent out on widely used global health listservs, including those of the Global Health Council, the American Public Health Association, the Collaboration and Resources Group for Child Health (the CORE Group), the World Federation of

[1]Available at the Centre for International Child Health, http://www.rch.org.au/cich.

Public Health Associations, and the Association of Schools of Public Health asking for information about documents, reports, and published articles which might qualify for the review. Finally, the Task Force contacted knowledgeable persons in the field, including members of the Expert Panel, for their suggestions for documents to be included. Documents not published in peer-reviewed scientific journals were included if they met the criteria for review, if they provided an adequate description of the intervention, and if they had a satisfactory form of evaluation.

This report is based on the findings from 416 published articles and other program documents and on 53 published literature reviews of appropriate community-based interventions. Our review is a comprehensive one, but at the same time we make no claim that it is a complete one. At present, the electronic database contains the findings of 296 articles. We still have 120 more articles in process of review which are not yet in our electronic database.

The Document Review Process of Individual Studies

Individual studies that qualified for inclusion were sent to two independent reviewers who each completed a Data Extraction Sheet. The two reviews were then consolidated by a third reviewer and transferred into an EPI INFO database. For a subset of 66 reports, which describe the implementation of a package of at least three separate interventions over a period of at least four years and which documented a statistically significant improvement in child health, a supplemental data extraction form was also completed in order to obtain further information about the implementation process.

The Current Document Database

The document database at present includes the following as shown in Table 1.

Table 1. Number of Articles and Documents Currently Included in the Review

Type of Document	Number
Review articles/documents	53
Individual articles/documents describing specific programs that were reviewed by two independent reviewers and the summative results placed into an EPI INFO database (including 66 that underwent a supplemental data extraction)	416
Total number of articles reviewed	469

A few documents are still being incorporated, but the overall findings of the review, presented here, should not be greatly affected.

Analysis of Information

For this report, an analysis has been carried out of extracted data from each of the individual studies included in the review. Our intent was not simply to summarize whether the intervention was effective or not in improving child health but, equally importantly, to derive information from the studies about the community context of these interventions, various ways in which specific interventions have been combined into specific ongoing programs, and the approach used in the community which led to the intervention having the desired effect. Further, more quantitative

analyses will be included in the specific journal articles arising from the review as well as a descriptive summary of the article findings.

Limitations of the Methodology

The review is limited to documents which describe the impact of program interventions. Publication bias is present and should be recognized at the outset. Program failures and serious challenges encountered in program implementation are rarely described in open-access documents. Furthermore, we are aware that all possible documents that qualify for inclusion have not been located, but we have attempted to be as comprehensive as possible given the constraints under which the review operated.

Additionally, most documents included in the review, particularly those in peer-reviewed journals, tend to have rigorous methods and clear findings, but space limitations often preclude the possibility of providing more than a cursory description of the community context and program implementation details. Although this limited our ability to understand completely the context of the studies, an effort was made to find out more information about the context of the larger studies through descriptions available elsewhere.

Funding and Other Support

Funds to cover the expenses of this review were provided by UNICEF, the World Bank, the Department of Child and Adolescent Health and Development of the World Health Organization, the CORE Group (Collaboration and Resources for Child Health)/USAID, and the Future Generations Graduate School. The American Public Health Association and its International Health Section staff administered the funds required to support the review. Future Generations Graduate School made it possible for one of its endowed professors, Dr. Perry, to co-chair this review, and it provided office space and administrative support. The World Bank made it possible for one of its consultants, Dr. Bahie Rassekh, to participate as a member of the Study Team and for another of its consultants, Dr. Mona Sharan, to assist with document review and critiques of write ups of the findings. The members of the Task Force contributed significant volunteer time as did many of the reviewers. Students at several universities, most notably the Johns Hopkins University, assisted with the review. The Johns Hopkins University also provided library support, which was essential for this project. The US Centers for Disease Control and Prevention in Atlanta provided technical support related to the EPI INFO software used in the study. Those organizations that provided financial support had no role in the execution of the review.

Findings

How strong is the evidence that CBPHC can improve the health of children at the population level and sustain that improvement?

There is strong scientific evidence that a number of different single community-based interventions, as outlined below, as well as combinations of community-based interventions can lead to substantial improvements in the health of children living in geographically defined areas. There is also strong scientific evidence that packages of community-based interventions can be effective when they are a part of a broader array of health and development services. The application of many of these specific interventions at scale in developing countries has been responsible for much of the dramatic progress in reducing the number of child deaths around the world.

We found numerous examples of programs that had a sustained impact of 10 years or longer when the following conditions were met:

- The program addressed epidemiological priorities of children
- Proven and affordable interventions existed to address these priorities
- The programs were carefully designed at the outset
- Adequate long-term funding was assured

More details are provided below in the section "What lessons can be drawn from both unsuccessful and successful experiences?"

What specific CBPHC activities improve child health?

The review builds on the extensive evidence that the following interventions and approaches are effective and should receive priority in programming of community-based interventions:

- BCG, polio, diphtheria, pertussis, tetanus, measles, Haemophilus Influenza Type b (Hib), pneumococcus, and rotavirus immunizations for children and tetanus immunization for mothers and women of reproductive age
- Provision of preventive vitamin A supplements to all children 6-59 months of age and to post-partum mothers
- Provision of preventive zinc supplements to all children 6-59 months of age
- Promotion of breastfeeding immediately after birth, exclusive breastfeeding during the first 6 months of life, and continued breastfeeding after 6 months of age
- Promotion of appropriate complementary feeding beginning at 6 months of age
- Promotion of hygiene (including handwashing), safe water, and sanitation

- Promotion of oral rehydration therapy (ORT) and zinc supplementation for children with diarrhea
- Promotion of clean delivery, especially in settings in which most births occur at home and hygiene is poor
- Community-based treatment of childhood pneumonia
- Home-based neonatal care, which includes promotion of immediate and exclusive breastfeeding, promotion of cleanliness, prevention of hypothermia, and diagnosis and treatment of neonatal sepsis by Community Health Workers (CHWs)
- Community-based rehabilitation of children with protein-calorie malnutrition through provision of food supplementation (including rehabilitation of children with severe acute malnutrition through the provision of ready-to-use dry therapeutic foods)
- Insecticide-treated bednets (ITNs) in malaria-endemic areas
- Indoor residual spraying in malaria-endemic areas
- Community-based treatment of malaria
- Intermittent preventive treatment during pregnancy (IPTp) in malaria-endemic areas
- Intermittent preventive treatment during infancy (IPTi) of malaria in malaria-endemic areas
- Detection and treatment of syphilis in pregnant women in areas of high prevalence
- Prevention of mother-to-child transmission (PMTCT) of HIV infection
- Iodine supplementation in iodine-deficient areas where fortified salt is not consumed

There is some evidence that the following community-based interventions are efficacious but more supporting evidence is needed. These include:

- Community-based rehabilitation of children with protein-calorie malnutrition through the Positive Deviance/Hearth approach
- Provision of prenatal calcium in calcium-deficient populations for prevention of pre-eclampsia and eclampsia[2]
- Detection and treatment of asymptomatic bacteriuria[3]
- Application of a topical antiseptic to the umbilical cord of neonates
- Skin cleansing of newborns with a topical antiseptic soon after birth
- Improved airway management and resuscitation in neonates by appropriately trained CHWs
- Reduction of household smoke by placement of improved cooking stoves (to reduce childhood pneumonia)

[2] Pre-eclampsia and eclampsia are life-threatening conditions in pregnancy associated with hypertension, seizures, and death of the fetus.

The following interventions have evidence of effectively improving child health and providing other important benefits beyond child health. These interventions need to be built into the policies and programs to improve child health, but further research is also needed regarding their specific impacts on child health and their pathways of influence. These interventions include the following:

- Participatory women's groups for empowerment and education about maternal and neonatal health issues
- Micro-credit programs for women, conditional cash transfers to women (in which poor women receive cash transfers with the condition that they obtain certain health services), and education of girl children

With respect to integrated programs (defined as those with at least three child survival interventions), the review confirms that they can be effective in improving child health. These programs have strong community outreach components including: home visits to all households, use of community-based health workers, and strong partnerships with the community and community mobilization.

The following community-based interventions have been rigorously evaluated and do not appear to have a beneficial effect on the health of children:

- Supplementary feeding programs in non-emergency situations[4]
- De-worming medication for children (on growth or on cognition/school performance)

The following community-based intervention has not had sufficiently rigorous evaluations to be able to determine its effectiveness for improving child health:

- Growth monitoring and promotion[5]

The following community-based interventions appear to have adverse effects:

- Iron supplementation (when provided to all children regardless of anemia status), which produces a slightly increased but significant risk of diarrhea in one recent meta-analysis of multiple studies
- Iron supplementation to children in malaria-endemic areas, which led to an increased need for hospitalization and/or death in one well-designed study
- Micronutrient mix of iron and other minerals including zinc and riboflavin, which was associated with an increased risk of diarrhea in one well-designed study

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[3] Presence of bacteria in the urine

[4] Supplementary feeding programs are those in which the program provides supplemental food beyond that which is currently available through routine channels. Normally not all households receive food supplements, and program-related criteria are established to define who receives them.

[5] Growth monitoring is an indispensable tool for assessing the nutritional status of children in a population, and this can be carried out by sampling children for measurement. Whether growth monitoring linked to promotion of optimal feeding of infants and children leads to better outcomes than promotion alone has not been clearly established in spite of the widely held belief that growth promotion is useful (Ashworth et al., 2008).

What conditions (including those within the local health system) facilitate the effectiveness of CBPHC and what community-based approaches appear to be most effective?

The first condition is for the health system to earn the trust and respect of the community. Achieving high levels of coverage of key interventions, for instance, depends on the local population having confidence in the local health system. Trust, respect, and confidence arise when local people have reason to believe that the health system provides quality services (including treating its clients with respect) and has basic drugs and supplies.

Second, effectiveness depends on having a strong outreach system. Some of the interventions required to improve child health require technical expertise, drugs, vaccines, and equipment not available in communities. Health systems need to provide immunizations, for instance, at outreach sites that are readily and predictably available to the population in order to achieve high levels of coverage. These outreach service delivery points provide a key opportunity for strengthening other community-based services in addition to immunization.

Third, health systems need some type of community-based worker in order to implement many interventions and to reach those who need them. These workers must be appropriately trained and supported. If they are unpaid volunteers, they must have a limited set of tasks and not be expected to work more than a few hours a week; otherwise they tend to abandon their responsibilities. An effective procedure must exist for promptly selecting and training new community-based workers to replace those who are no longer functioning.

Fourth, a method of developing and maintaining contact with all homes and mothers is necessary in order to identify pregnant women and young children, to provide services in the home when possible, and to identify those in need of services which cannot be provided in the home. Routine systematic visitation of all homes by community-based workers is a common approach to achieving this. Maintaining a register of vital events, including births and deaths, and a register of all families facilitates tracking of children to ensure that all are reached with program services.

Fifth, community-based approaches are particularly relevant for interventions which involve behavior change at the household level such as birthing practices, neonatal care practices, infant feeding practices, and hygiene, all of which have great importance for child health. Many of these behaviors are based on ingrained cultural beliefs and practices, and health systems have been notoriously ineffective in changing them.

Sixth, CBPHC can make its greatest contribution when health systems are weak and under-5 mortality is high. Stated another way, when health systems are well-developed and under-5 mortality levels are low, then strengthening CBPHC may not provide as much additional benefit. For instance, in some developing countries with well-developed health systems and lower under-5 mortality, vaccinations are given primarily in health facilities yet coverage exceeds 90% (R. Steinglass, personal communication). Thus, the potential contribution of CBPHC is contextual and may well vary among interventions.

Finally, compassionate and high-quality curative and referral care, including basic hospital and surgical care, lends credibility to the community-based work and the workers that provide it. There is increasing evidence that these higher-level support services can be provided less expensively than is generally recognized.

What program elements appear to improve child health?

If CBPHC activities are going to reduce child mortality, the interventions need to (1) address the priority health needs among children in the population and (2) reach those at greatest risk. For instance, if pneumonia among children aged less than 2 years is far and away the leading cause of under-5 death, then program activities should similarly reflect this priority. In high-mortality settings with weak health systems, ways have to be found to ensure that those families who are at the margins either geographically or socially receive priority services. The children of these families generally have a considerably higher risk of death than other children and therefore merit priority attention from both the public health point of view as well as from the equity point of view.

How strong is the evidence that partnerships between communities and health systems are required in order to improve child health?

Many examples point to interventions and programs that have improved child health without any active involvement of the community. Numerous efficacy studies demonstrating strong evidence of child health impact over short periods of time have been carried out without a well-established community partnership. However, we found that communities were involved in implementation in 58% of the successful programs in the review; they were involved in planning in one-quarter and in evaluation in one-fifth of the programs. Among the successful programs that implemented three or more interventions over a period of at least four years, all had established strong partnerships with the community.

The review was limited to studies which employed some type of CBPHC to improve child health. Therefore, we did not search for studies that provided services only in facilities.

Optimally effective planning, implementation, and assessment of CBPHC programs require community involvement. The need for this is clearest for behavior change interventions such as promotion of breastfeeding and handwashing, and for community case management of childhood diarrhea, pneumonia, malaria, and neonatal sepsis. For other interventions (e.g., immunizations, micronutrient supplementation), community engagement is important to ensure that children who need an intervention are taken to where they can receive it. CBPHC requires practical and convenient linkages with existing delivery systems, facilities, and other resources. Populations with the most limited access to formal health care are typically in the most unreached areas where mortality is the highest and impact can be greatest. Here also equity issues are central. The processes required to develop and maintain effective partnerships between health intervention delivery systems and communities vary greatly, as they should, because of the marked variation in conditions encountered from one locale to another.

Program flexibility is often difficult because of bureaucratic procedures within ministries of health and because of donor-imposed limitations. Community involvement becomes even more difficult as a result. We need to create a more favorable international climate of support among donors, policy makers, and high-level opinion leaders that is favorable to CBPHC and that enables programs to more readily adapt to local circumstances. Building trust with communities and developing strong community participation takes time, and funding periods of 4-5 years are not sufficient to build strong CBPHC activities which are maximally effective in producing sustained improvements in child health.

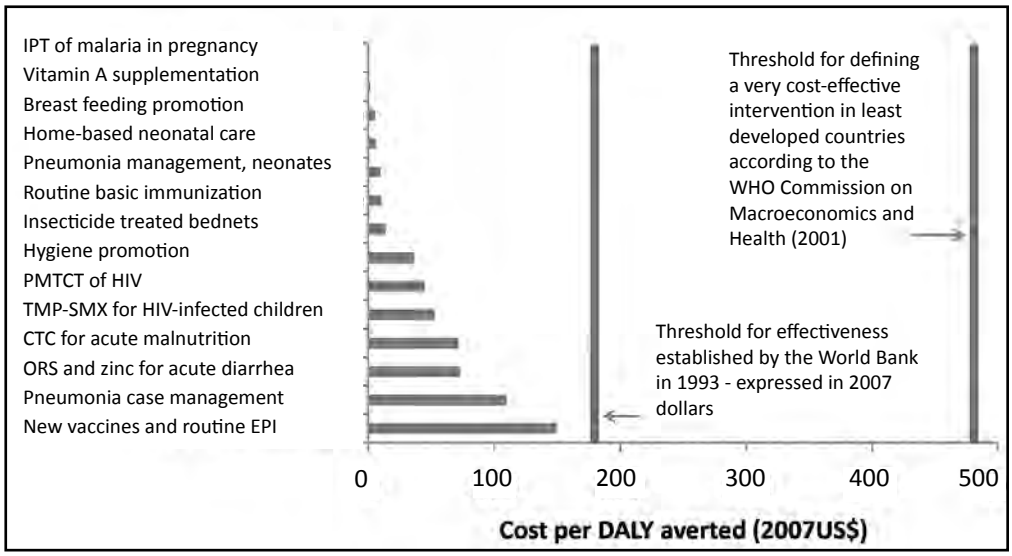
Changes in family and community practices are now increasingly recognized to be important for further improvements in child health (such as handwashing, exclusive breastfeeding, and seeking early appropriate medical care when signs of childhood pneumonia develop). Successful promotion of these kinds of behaviors requires a stronger relationship between the health system and the community than "simple" outreach activities (such as increasing immunization and vitamin A coverage). Expectations from donors for a marked reduction in mortality in periods of four years or less can be unrealistic, especially in large-scale programs. However, examples exist of programs that were able to achieve rapid mortality declines once they were fully operational.

How strong is the evidence that CBPHC can be cost-effective?

Several of the reports included in the review estimate the cost per death averted, cost per year of life gained, or cost per disability-adjusted life year (DALY) averted. Other estimates of cost-effectiveness of CBHPC are available in published documents. Figure 1 summarizes the findings of the cost-effectiveness (expressed as cost per DALY averted) of individual interventions, and Figure 2 summarizes the findings for the cost-effectiveness of integrated approaches. CBPHC interventions for improving child health are among the most cost-effective interventions known (Jamison, 2006).

The cost per DALY averted for the specific community-based child survival interventions shown in Figure 1 are all $190 or less, making them highly cost-effect as defined by the WHO Commission on Macroeconomics and Health, and the World Bank.

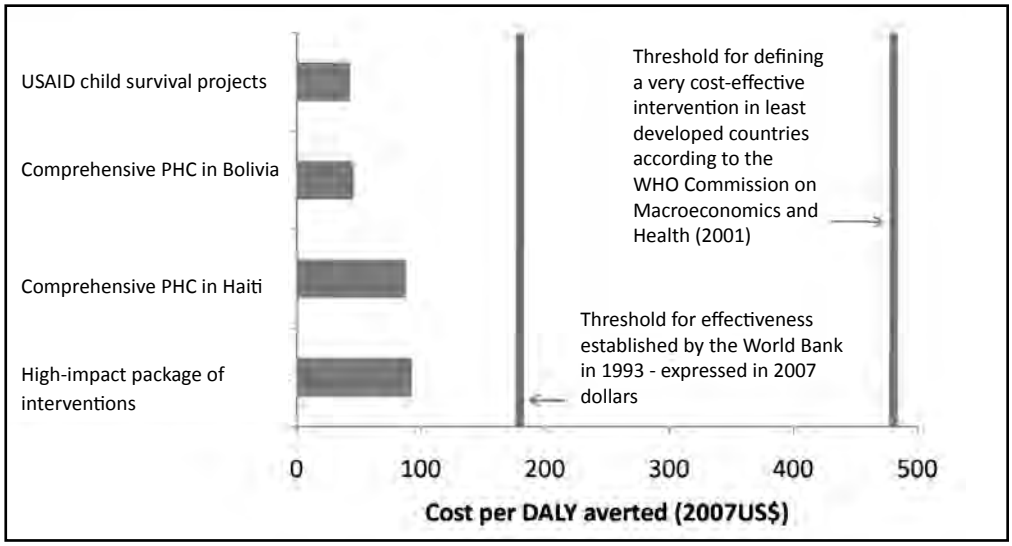
Figure 1. Cost per DALY Averted with Community-based Interventions to Improve Child Health



Abbreviations: DALY-disability-adjusted life year; IPT-intermittent preventive treatment of malaria; PMTCT-prevention of mother-to-child transmission; TMP-SMX-cotrimoxazole; CTC-community-based therapeutic care; ORS-oral rehydration solution; EPI-expanded program on immunization

Evidence for the cost-effectiveness of integrated programs is less well-developed. We identified one review of the cost-effectiveness of child survival programs supported by the US Agency for International Development and implemented by US-based international NGOs, one cost-effectiveness modeling exercise of an integrated package of child survival activities, and two cost-effectiveness assessments of comprehensive primary health care programs. In all cases, the cost per DALY averted was in the range of the cost per DALY averted for single interventions and highly cost-effective when judged by global criteria (Figure 2).

Figure 2. Cost per DALY Averted with Community-based Interventions to Improve Child Health



Abbreviations: DALY disability-adjusted life year; USAID-United States Agency for International Development; PHC-primary health care

Note: References in descending order for the reviews shown on left are: (Ricca, 2008; Perry et al., 1998; Perry et al., 2009b; Edejer et al., 2005).

In situations in which primary health care facilities are burdened with more patients than can be adequately managed, strong CBPHC activities can reduce the patient load, thereby actually saving money for the health system as a whole as well as for patients and their families. In other settings in which there is under-utilization of available health services at primary health care facilities, there is strong reason to believe that a strong program of CBPHC activities can increase utilization of services, making the health care system more efficient and effective.

How strong is the evidence that CBPHC can promote equity?

The inequities which exist with respect to child health in priority countries are based largely on socio-economic status (SES) and its covariates, such as ethnicity, geographic location, and level of maternal education. Children in the lower SES groups (and particularly those in the lowest quintile) have higher exposure to disease, lower coverage of key child survival interventions, higher levels of malnutrition, less access to health care (and when services are used, the quality for the poorest is lower), and higher mortality rates (Victora et al., 2005a; Victora et al., 2003). In spite of overall improvements in child health globally, inequities between countries and within countries appear to be widening (Wagstaff et al., 2004). In other words, progress is uneven. The health of children in countries that are better off socioeconomically is improving more rapidly than that of children in poorer countries. And within countries, the health of the children in higher SES households is improving more rapidly than that of the poorest children.

Is there evidence that CBPHC promotes equity at the same time that it improves child health? Defining level of equity as the degree to which the level of a specific health indicator was evenly distributed throughout the wealth quintiles of a population, an NGO-facilitated community-based maternal and neonatal health program in rural India demonstrated that the introduction of CBPHC improved the equity of program coverage relative to a comparison district (Baqui et al., 2008). Studies of the Pastoral da Criança, a Roman Catholic health support group in Brazil, which trained volunteers to visit the poorest homes in the community, showed that mothers who received support from the Pastoral had better knowledge about proper child nutrition and health care and more favorable child care practices (Neumann et al., 1999a; Neumann et al., 1999b). One study from Zambia and Ghana has shown that linking ITN distribution to a national mass measles immunization promoted equity (Grabowsky et al., 2005).

Experience has shown that the stronger the outreach services of a CBPHC program, the more likely the program will reach those who need the child survival interventions and the more likely the program will reach those who are in the lowest wealth quintile. Facility-based programs without strong outreach services are inherently inequitable for several reasons. Firstly, utilization of health facilities decreases exponentially as one's distance from the facility increases. Secondly, since health facility utilization involves a pro-active decision that involves significant costs in terms of time, transport fees, and user fees, the poorest households (which are likely to be those in greatest need of the services) are less likely to use the facility-based services. When strong outreach services are available through CBPHC, these barriers are diminished. From this perspective, CBPHC approaches which provide services to all households can have a strongly positive equity impact.

There is evidence that even within strong CBPHC programs with demonstrated improvements in child health outcomes, considerable inequities may still remain. In the Hôpital Albert Schweitzer primary health care service area, where the under-5 mortality rate was one-half that for rural Haiti in spite of similar levels of nutritional status and socio-economic characteristics, there were major disparities in child health within the service area. One-third of the children lived in the more distant mountainous communities, and their under-5 mortality rate was twice that for children living in the plains (Perry et al., 2007b). This evidence suggests that even strong and effective CBPHC programs are likely to continue to have inequities that need monitoring and that demand special efforts to redress.

CBPHC makes services more readily accessible than is possible through provision of facility-based services. Delivery of services at the home (including provision of health education) is certainly a strong pro-equity strategy. One could argue that the poorest households require an even more intensive home visitation schedule than do better off households if optimal equity gains are to be achieved. We are not aware of any reports where this strategy for delivering CBPHC services for children has been applied and tested.

Considerations of equity must go hand in hand with discussions of coverage, however. Equity issues must take second-place when overall coverage levels are low. If equity exists, but coverage levels are only 10%, then not much progress has been made. Promotion of equity may make public health sense only when coverage levels are reasonably high.[6]

What general lessons can be drawn from both unsuccessful and successful experiences?

Strategies for working with communities

The lessons of greatest interest for the purposes of the review are those related to how programs implementing CBPHC interventions were able to work with communities to achieve these results. Table 2 describes the strategies most commonly employed. Training community health workers, promoting partnerships between communities and health programs, drawing on local resources for program support, and promoting community and women's empowerment were common features of successful CBPHC programs.

In over half (58.0%) of the programs, the community was highly or moderately involved in the implementation of the program, and the community was moderately or highly involved in planning in one-quarter (26.8%) of the programs and in evaluation in one-fifth (21.6%). Reviewers identified factors described in reports that appeared to have been important in a program's success. As shown in Table 3, the most important of these are using local resources, building partnerships involving the community, a commitment to equity, adapting the program to local conditions, fostering long-term sustainability, and benefitting from strong local leadership.

In over half (59.7%) of the programs, the reviewers judged that community participation contributed to the success of the program in improving child health, and in 54.4% the linkage between the community and the health system contributed to the success of the CBPHC program.

[6] We are grateful to Robert Steinglass for this point.

Table 2. Community-related Activities Commonly Employed in Successful CBPHC Programs to Improve Child Health

Activity	Percentage of successful programs included in review (n=296)
Training of community health workers	73.5%
Promotion of partnership between the community and the health program	60.9%
Promotion of local resources for program support	58.5%
Promotion of community empowerment	53.9%
Promotion of women's empowerment	43.4%
Formation and/or support of community groups	39.3%
Promotion of systems for adaptive learning	39.2%
Promotion of leadership in the community	36.0%
Promotion of equity	30.3%

Table 3. Program Characteristics that Reviewers Rated as Important for Success in Improving Child Health through CBPHC Approaches

Program Characteristics	Percentage of successful programs included in review (n=296)
Use of local resources	59.4%
Partnerships involving the community, technical advisors, and program managers	58.4%
Commitment to equity	45.7%
Adaptation to local conditions	44.9%
Fostering long-term sustainability	42.6%
Presence of strong local leadership	33.1%

Testing the efficacy of an intervention in a highly controlled field setting (in which proper training, supervision, supplies, and logistics are assured) is essential. Many of the studies of single interventions fall into this category. Testing the effectiveness of an intervention in a more routine setting is also important but more difficult. Separating the effect of a single intervention from other program influences in routine field settings can be problematic unless quasi-experimental designs are employed, and carrying out such studies has been a challenge. Finally, the review includes very few high-quality studies of the effectiveness of integrated programs in improving child health in routine settings. The evidence is encouraging, but more studies are needed, particularly using stronger research methodologies for programs at scale.

Lessons from Unsuccessful Experiences

Very few unsuccessful experiences have been adequately documented and reported. This is unfortunate, because anecdotes abound about failed community programs. The lack of documentation limits our ability to learn where the problems are in order to find solutions. But the converse is also true: there are many successful community programs that have not been documented or appropriately evaluated leading to missed learning opportunities as

well. Additionally, much of the existing documentation of successful programs provides little information about the context or the means of program implementation, thereby limiting the opportunity for practical learning. The review process attempts to account for these limitations (see Methodology section, above).

Lessons from Long-Term Successful Disease-Specific CBPHC Approaches

Top-down vertical approaches to implementing single interventions at the community level to improve child health can be very effective at scale. Immunization programs are perhaps the best example of this. Coverage levels globally have increased from less than 5% in 1974 to 80% at present, and an estimated 3 million child deaths are being averted annually as a result of this program (R. Steinglass, personal communication).

Diarrheal disease control programs in Egypt and Bangladesh in the 1980s provide more examples of top-down vertical approaches to implementing a single intervention that have resulted in marked improvements in the health of children at scale. However, the approaches in Egypt and Bangladesh were very different. In Bangladesh, trainers visited every home in the country providing education about preparation of home-based oral rehydration solution (ORS) using common home ingredients (sugar and salt) while in Egypt, with virtually universal access to television and a well-developed primary health care system, the program focused on public education, training health care providers (including pharmacists), and mass distribution of packets of oral rehydration therapy (ORT) packets. In both cases, there is strong evidence that the programs contributed to reduction in diarrheal deaths on a national basis. In both cases, the strategy arose from an epidemiological assessment which identified diarrhea as the leading cause of child death. Both strategies were carefully developed at the outset in accordance with local realities; a strong program of monitoring, evaluation, and impact assessment was devised before beginning program operations; and the program was scaled up gradually, making adjustments based on experience and on findings from monitoring and evaluation. In both cases, funding support continued for 10 years, making it possible to scale up activities and achieve a national impact (el-Rafie et al., 1990; Chowdhury and Cash, 1996; Miller and Hirschhorn, 1995).

Lessons from Long-term Successful Integrated Approaches

The review identified successful CBPHC programs that have implemented a comprehensive set of interventions in a participatory manner over a period of 10 years or longer. These programs were on a much smaller scale (serving 2,000-300,000 people) except for the BRAC program, which now serves 110 million people. As Table 4 demonstrates, these long-term programs had a number of important shared characteristics: a broad array of primary health care services such as family planning and reproductive health, access to referral care at higher levels, utilization of community-level workers and support for them through strong training and supervision, routine systematic home visitation, a strong partnership between the health program and the community, a strong level of community trust in the health program, and treatment of clients with a high level of respect.

Building these elements into all programs serving high-mortality, resource-poor settings is a challenge. However, these are the elements that appear to be important for sustainable and effective programs at the community level.

Table 4. Common Characteristics of Eight Successful Longer-Term Integrated Programs for Improving Child Health[a,b]

Characteristics	Findings for the Eight Programs
Range of services provided	Provision of a comprehensive array of preventive and curative primary health care services (child health, maternal health, reproductive health, and family planning)
	Presence of a strong referral system from the community to higher levels of care at fixed facilities, including hospitals with surgical capability[c]
Health program management and support	Presence of a strong system of management and supervision led by competent and dedicated professionals (including maintaining needed supplies and drugs)
	Achievement of a record of treating patients and clients with a high level of respect
Nature of community partnerships/community involvement	Presence of a strong partnership between the program and the community, with a strong level of trust in the community toward the program
	Strong training and support of community-based workers present, the workers are an integral part of the program, and financial support for them is assured[d]
Role of community-based workers	Community-based workers achieve routine contact with all families[e]
	Essential services for improving child health provided in the home

Notes: a. Hôpital Albert Schweitzer in Haiti, established in 1956 (Perry et al., 2007a); the Under-Fives Clinic of the Wesley Guild Hospital in Imesi Ile, Nigeria, established in 1956 (Cunningham, 1978); the Matlab MCH-FP Program in Bangladesh, established in 1965 (Aziz and Mosley, 1997); the Jamkhed Comprehensive Rural Health Project in Maharashtra, India, established in 1970 (Arole and Arole, 1994); BRAC in Bangladesh, established in 1981 (Rohde, 2005); the Society for Education, Action and Research in Community Health (SEARCH) in Maharashtra, India, established in 1985 (Bang et al., 2005); and the Navrongo Community Health and Family Planning Project in the Kassena-Nankana district of rural northern Ghana (Binka et al., 2007).

b. The evidence for many of the assertions in this table can be found in one of the review documents (Perry et al., 2009a). Other assertions are based on subjective impressions of the senior author based on three or more visits to the communities served by five of the eight programs.

c. Given the scope of BRAC's program and the limited capacity of the health care system in Bangladesh to provide curative care in facilities, it has been difficult to provide referral services when needed, although BRAC has established some health centers and in a few cases limited surgical care in health centers.

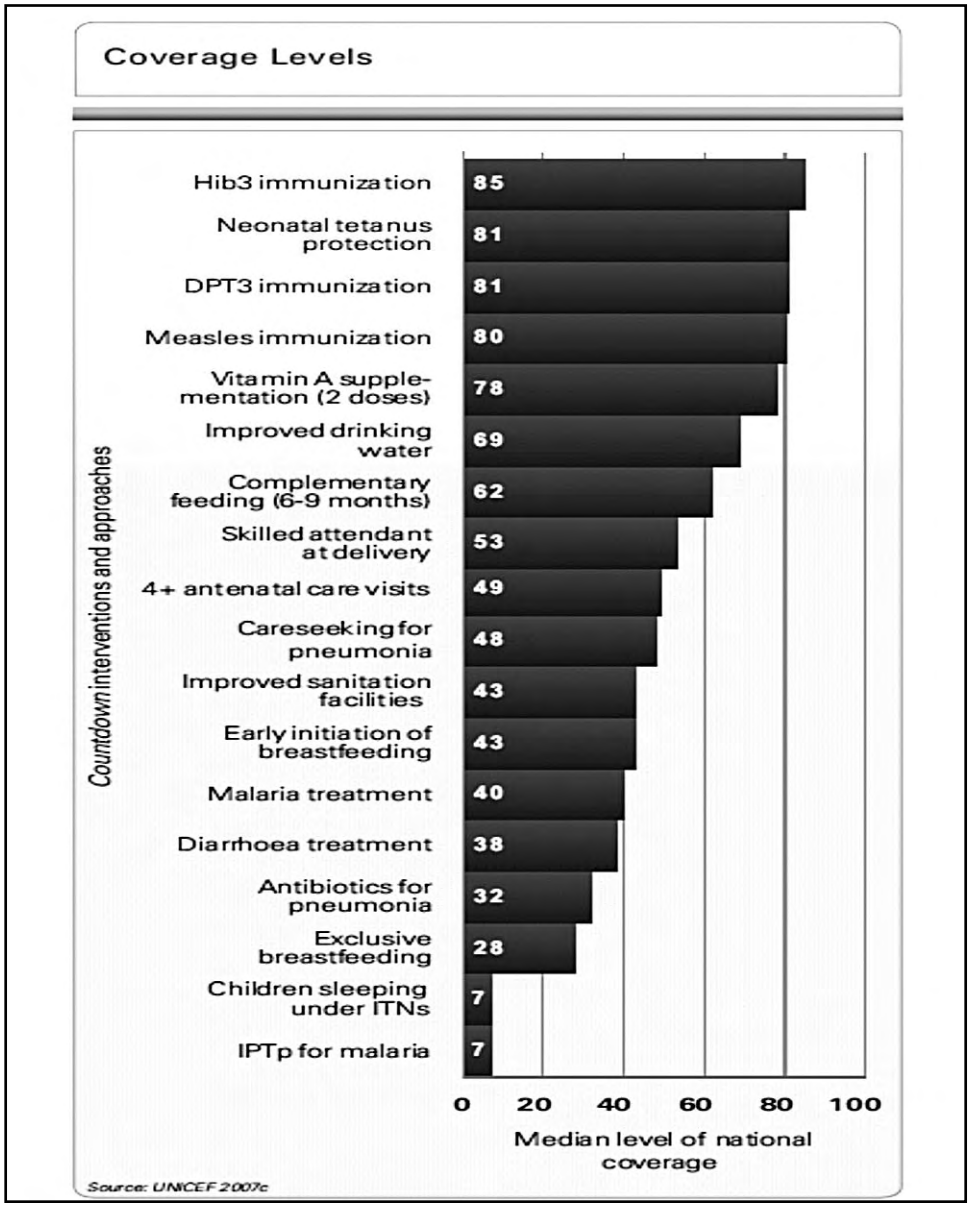
d. Although the Jamkhed CHWs do not receive a salary, they do receive special training for income generation and access to credit to enable them to become economically self-sufficient. The Jamkhed Comprehensive Rural Health Project ensures that their CHWs have enough income to meet their needs. BRAC CHWs earn income from selling supplies and health-related products to villagers.

e. The Jamkhed CHWs are in frequent contact with everyone in the community even though they do not have a systematic process for visiting each home on a fixed schedule.

Variation in Coverage of Proven Interventions

There are marked differences of coverage of proven interventions in high-mortality settings. In the 68 priority countries analyzed in the Countdown to 2015 Report (UNICEF, 2009), coverage levels were high (78-85%) for immunization and vitamin A supplementation. Coverage levels were moderate (38-69%) for diarrhea treatment, malaria treatment, early initiation of breastfeeding, improved sanitation facilities, care seeking for pneumonia, 4+ antenatal care visits, skilled attendant at delivery, complementary feeding (6-9 months), and improved drinking water. Coverage was low (7-32%) for IPTp for malaria, children sleeping under ITNs, exclusive breastfeeding, and antibiotics for pneumonia (Figure 3). There is a particularly urgent need to strengthen the coverage of interventions that address behavior change in the home (such as exclusive breastfeeding and appropriate complementary feeding) and interventions that provide community-based case management of serious childhood illness to mothers around the clock (for pneumonia, diarrhea, malaria, and neonatal sepsis).

Figure 3. Median National Coverage Levels for Selected Countdown Indicators and Approaches Across the 68 Priority Countries, most recent estimate (UNICEF, 2009).



Issues in Integration, Impact, and Equity

Is there any evidence that moving from fewer to more interventions affects coverage or health impact disproportionately among the poorest children? One could make the argument that overall coverage might decline as resources are spread more thinly among more interventions, leading to worsening inequities for the poorest children. This would be particularly true in situations in which the delivery system is already excluding a significant proportion of children.

On the other hand, one could argue that in certain circumstances, adding more interventions can lead to greater impact at no extra cost or at minimal extra cost. In this case, if coverage is not sacrificed, then perhaps the impact on equity would be even more favorable if the greatest burden of disease is among the poorest children.

There is even recent evidence that integration actually improves coverage. A recent study involving 2.35 million people in 35 health districts of Cameroon, Nigeria, and Uganda compared the coverage of ivermectin for onchocerciasis after the addition of community-based distribution of vitamin A to children, ITNs to pregnant women and children, and home management of malaria with the coverage of ivermectin in communities without the additional burden of other interventions. Not only were high levels of coverage achieved for the additional interventions, but the coverage of ivermectin was greater in the communities with integrated services (Special Programme for Research and Training in Tropical Diseases, 2008). The approach used here is an extension of the community-directed treatment with ivermectin, developed in the mid-1990s by the African Programme for Onchocerciasis Control. [7] The Narangwal study also provides evidence in which integration of children's health care services, women's health care services, family planning services, and nutrition services in study villages led to no diminution in the impact of each intervention compared to the impact of the same interventions when they were provided solely in comparison villages without integration. Marked improvements in efficiency and in cost-effectiveness were also observed (Taylor and Parker, 1987).

The concept of building upon immunization outreach sites as a platform for providing other interventions is an important one since immunization outreach sites make it possible to achieve high levels of coverage in high-priority countries, as Figure 3 demonstrates. Linking vitamin A distribution with routine EPI services has been well-developed in many countries, and there is growing experience in linking the distribution of ITNs to routine EPI services (either through direct distribution or through the distribution of vouchers which can be used to obtain an ITN). Messages about other services, such as family planning, counseling about infant feeding practices, or provision of intermittent preventive treatment for infants (IPTi) to protect against malaria, could be provided at the same time as a routine EPI contact (especially at the time of DPT1, 6 weeks post-partum) (Immunization Basics, 2007).

In one assessment, ITNs were distributed as part of a national mass measles immunization program in Zambia and Ghana, and in both cases increases in coverage for subsequent ITN use among children was greater in the poorest households than in the least poor households. At least in this case, linking interventions not only was cost-effective and efficient, it also promoted equity (Grabowsky et al., 2005).

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[7] We are grateful to William Brieger for bringing this report to our attention.

Another study reported a 54% increase in the number of family planning clients without any detrimental effect on EPI services as a result of clients receiving family planning messages at the time of receipt of EPI services, and EPI providers expressed satisfaction at being able to provide additional services to their clients (Huntington and Aplogan, 1994). UNICEF refers to this strategy as Immunization Plus.[8]

Distinguishing between Community-based Interventions that Can Be Delivered through Outreach and Those that Require Access to Services at All Times

One of the remarkable achievements of the EPI Program has been its capacity to deliver immunization services at outreach sites. Outreach sites were developed initially for routine EPI services but they also are used now for special mass campaigns for measles and polio immunization and also for vitamin A distribution. As Figure 3 demonstrates, achieving high levels of coverage of 78% or more for immunizations and vitamin A supplementation has been one of the great achievements for reducing mortality in priority countries. However, the recent evaluation of the UNICEF Accelerated Child Survival and Development Program (ACSD), which targeted expanded coverage of key child survival interventions in 16 districts in Benin, Ghana, Mali, and Senegal, found that the ACSD Program was much more successful in increasing coverage for services that could be provided through outreach and campaign strategies that did not require a skilled provider (Bryce, 2008). We need more expertise in improving the coverage and scale of interventions that require stronger community collaboration, especially with those that involve trained community-based providers available to manage acute childhood illnesses (such as pneumonia or neonatal sepsis) and to promote behavior change (such as exclusive breastfeeding). The findings from this review will hopefully provide some guidance on strategies for testing new approaches for achieving this. Bringing CBPHC services closer to homes and having them available at all times is one of the key challenges for realizing the potential of CBPHC for accelerating child survival in priority countries.

What additional research is needed?

One of the most important findings from our review is that the existing evidence base regarding intervention efficacy and effectiveness rests primarily on studies of individual interventions provided in atypical field settings over relatively short periods of time, usually two years or less. There is a notable lack of studies of interventions in routine field settings at scale over longer periods of time. In addition, there is a notable lack of studies of both types – short-term in highly controlled field settings and long-term in more routine settings – of combinations of interventions (so-called "packages") and of programs providing more comprehensive services. Others (Bhutta et al., 2005) came to a similar conclusion in their review of 740 studies of the effectiveness of community-based interventions for improving perinatal and neonatal health outcomes. They found only 10 studies that were carried out in routine field settings that could be considered effectiveness trials. A review of studies of packages of community-based interventions to improve neonatal health found no studies at scale in routine settings (Haws et al., 2007).

These reviews have led to calls for more research on the effectiveness of interventions in routine settings in larger populations using stronger methodologies. Also, there have been calls for more research on the effectiveness of behavior change packages at the household level, on the effectiveness of treatment of newborn illness within the community (especially related to asphyxia

8 See http://www.unicef.org/immunization/index_immunizationplus.html.

and sepsis), and on which type of community health workers are best able to provide community-level interventions that promote maternal, perinatal, and neonatal health. Finally, they emphasize the need for more studies of cost-effectiveness. They state that major barriers to improving routine programs include (1) a failure to empower communities and to mobilize communities to embrace effective interventions and (2) a lack of understanding of community practices and culture.

There is a need for effectiveness trials carefully tailored to local health needs and circumstances and conducted at scale for improving neonatal health. One recent study (Bhandari et al., 2004) assessing complementary feeding by Anganwadi workers in India is notable for the application of a rigorous evaluation methodology to a routine service situation.

Assessing the effectiveness of combinations of interventions at scale requires, among other things, new methods designed to determine: (1) whether the interventions reach those for whom they were intended at an acceptable level of quality; (2) whether there is any evidence that child health improved, and (3) whether any documented improvements in child health can be plausibly attributed to the interventions (Victora et al., 2004). Such methods will need to include assessments of the context of program implementation in order to provide proper interpretation of results (Victora et al., 2005b). The experience of the Multi-Country Evaluation of Integrated Management of Childhood Illness provides a framework for addressing these issues for large-scale programs (Bryce and Victora, 2005).

Importantly, there is a need to involve communities themselves in the monitoring, evaluation, and research process. Collaborative research endeavors between academic institutions and communities have only recently begun to bear fruit in developed countries (Minkler and Wallerstein, 2008), but the potential for such collaborations to strengthen health programming in resource-poor settings is substantial. One example of this is the role that 226 communities working with an alliance of 13 local NGOs in Maharashtra, India, played in carrying out an audit of the government's vital events registration system, documenting that neonatal, infant, and child mortality rates were each underestimated by nearly 20 points (Bang et al., 2002). This raised awareness about the importance of child mortality in the state and led to government reforms designed to strengthen the government's vital events registration system (A Bang, personal communication, 2008).

Long-term funding and institutional support from research institutions are needed to strengthen local operations research capacity to enable monitoring and assessment of the effectiveness of specific CBPHC programs in improving child health. The tools used at the local level need to be rigorous but at the same time affordable and understandable to local professionals and to the collaborating communities.

How can successful community-based approaches for improving child health be scaled up to regional and national levels within the context of severe financial and human resource constraints?

International attention is focusing on innovative ways to scale up CBPHC approaches that improve child health. Some examples are the following:

- The gradual expansion of one key intervention to a national level under the direction of a single NGO, as was carried out by BRAC in its home-based training of mothers to prevent and treat childhood diarrhea (Chowdhury and Cash, 1996)

- The gradual expansion of a package of interventions to national level beginning with a small effective program implemented by one NGO, replication by other NGOs, and gradual transfer of the intervention into the government system as is currently underway in India with home-based neonatal care, established initially by the Bangs in Gadchiroli, India (Bang et al., 2005; Abhay Bang, personal communication, 2008)
- "Scaling down to scale up" in which a documented successful approach is replicated at other sites with strong local input and flexibility, allowing local champions to emerge, as has been carried out by the Navrongo Initiative (Nyonator et al., 2005) working through the Ministry of Health in Ghana (James Phillips, personal communication, 2008)
- A three-way partnership at the outset for scaling up, in which the community, government officials, and an outside agent (such as an NGO or technical support group) first establishes model program sites as nodes to adapt and systematize extension to large populations, as was done in China with the Model Counties Project (Taylor-Ide and Taylor, 2002) and as Future Generations has done with its SEED-SCALE approach to improve the health of children in Arunachal Pradesh (India), Tibet (China), Afghanistan and Peru (Taylor-Ide and Taylor, 2002)
- A "bottom-up" educational approach to scaling up, in which grassroots workers from many geographic areas and programs in different countries come to a central training center to learn empowerment and CBPHC, as is occurring at the Comprehensive Rural Health Program (CRHP) in Jamkhed, India (Arole, 2002), where 11,000 people from around India and 2,000 people from 100 other countries have now been trained (Rajanikant Arole, personal communication, 2007)
- Creation of a national framework giving local communities the option of establishing shared control over local community health programs, as has occurred in Peru's program of Communidades Locales para la Administracion de Salud (CLAS), under which one-third of the government's 2,400 health centers, their outreach services, and the activities of CHWs in the surrounding communities are now governed (Taylor-Ide and Taylor, 2002)
- Establishment of a cadre of government-paid community health workers throughout the country with gradual addition of responsibilities, as is happening in Brazil, Ethiopia, India, and Pakistan, for example

We need to test different approaches for rapid scaling up of CBPHC programs to achieve national impact. Even though "command and control" approaches can be used for scaling up standardized components of community-based interventions, in most poor countries such approaches have been supported by external donors for only a limited time period. This tends to produce initial successes that cannot be sustained after external funding ends. By contrast, new systematic processes can adapt to local realities in ways that promote community empowerment and long-term local sustainability. Different approaches to scaling up should be tested through rigorous implementation research. This would enhance the potential for greater effectiveness and long-term sustainability without over-dependence on central or international funding.

The experience in Bangladesh for scaling up CBPHC, both on a national basis and within BRAC as an NGO (Perry, 2000), provides strong guidance for other settings, as does the Navrongo Initiative in Ghana (Phillips et al., 2006) and the other examples mentioned above that have used many of these same principles in scaling up a successful CBPHC program.

What are the implications for regional, national and global health policy, for program implementation, and for donors?

The findings of this review highlight the need to focus greater attention and more resources on CBPHC for improving child health in high-mortality settings. There is great value in giving a stronger role to communities (and especially to mothers) for improving child health. Mothers and communities have a strong vested interest in the survival of children. Related to this is the need to create structures which make it possible and feasible to delegate certain technical responsibilities to well-trained and well-supervised CHWs, including identification of births for systematic referral for preventive interventions (such as immunization) and case management of neonatal sepsis, childhood pneumonia, and childhood malaria. Finally, independent assessments of large-scale program effectiveness in reducing under-5 mortality which are publicly available and which conform to international scientific standards are critical for continued improvements in program effectiveness.

Further Questions Raised in the Review

The review has led to an additional set of "second tier" CBPHC and child health questions which have arisen in the process of answering the review's original questions. Many of these "second tier" questions are related to Carl Taylor's dictum: "There is no universal solution, but there is a universal process to identify appropriate local solutions." The central "second-tier" question is how do we apply this dictum to CBPHC and child health? Further questions which the review raises are

- How can we develop field methods to feasibly and accurately determine local epidemiological priorities for children to guide local programming? (Epidemiological priorities are the most frequent, serious, preventable or readily treatable childhood conditions in the population.)
- How can we feasibly and accurately determine what the local population's perceptions of its own health priorities are?
- How do we define and measure empowerment of women and communities? How important is empowerment? How can we promote it?
- How can a targeted CBPHC approach at the same time effectively respond to local priorities?
- How can large-scale health systems build trust and partnership with local communities and promote accountability to local communities when these systems themselves are often dysfunctional? How can we advocate to multinational agencies and donors on the importance of this issue? How do we define and measure the partnership between health systems and communities? How important is it? How can we promote stronger partnerships?
- Which CBPHC interventions require integration with and support from a strong health system and which ones can be implemented with minimal or even no health system involvement? What are the most appropriate approaches to strengthening the formal health system to support interventions that cannot be carried out in the community alone without commodities and technical support, such as immunizations, provision of vitamin A and zinc supplements, and community-case management of childhood pneumonia and malaria?

- How can local creativity, local initiative, and local responsibility be encouraged to achieve appropriate local solutions? What are the most effective approaches to convincing mothers, families, and communities to adopt healthier behaviors for their children (and to not automatically pursue "over-medicalized" and "over-commercialized" approaches, e.g., infant formula instead of breast milk, antibiotics instead of symptomatic treatment for self-limited coughs and colds, and so forth)?
- How should the CBPHC package change in different contexts?
- What elements of CBPHC beyond routine immunization services should be present in all contexts, and what elements are best for specific contexts?
- What can be done to enhance the appreciation of CBPHC by leaders of formal health systems and their international partners?
- How can community-based approaches to improve child health be effectively integrated with other community-based approaches to prevent and treat HIV/AIDS, malaria, and tuberculosis?

To a certain degree, the answers to these questions require thinking about the situational and programmatic context in which CBPHC is being implemented. To promote further thinking on these questions, we propose the following typology as a framework to consider how the application of CBPHC interventions to improve child health might vary from one context to another (see Table 5).

Specific recommendations regarding the most effective approaches in specific contexts would be useful. These recommendations should be flexible so that they can be adapted to the special and unique circumstances that are always present in specific settings.

A Conceptual Framework for Planning, Implementation, and Evaluation

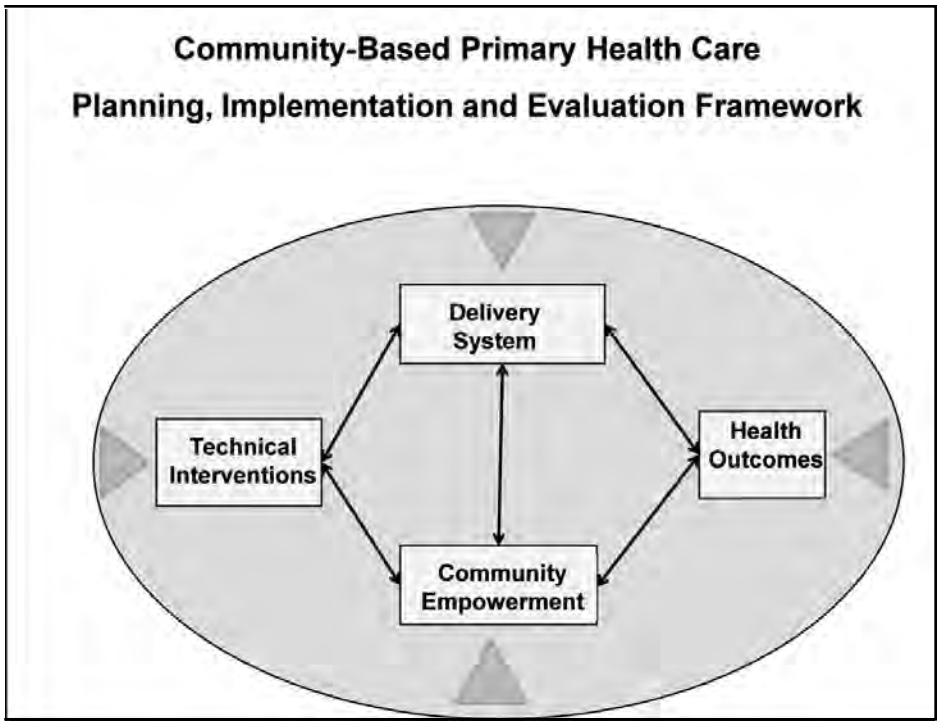
The conceptual framework in Figure 4, developed by the Expert Panel at its March 2008 meeting, emphasizes the importance of strengthening community empowerment as well as the delivery system in order to improve child health. The arrow pointing in both directions between the technical intervention box and the community empowerment box is meant to indicate the potential for stronger community empowerment to improve the quality of technical interventions. Similarly, a stronger delivery system can help to create stronger interventions. In both cases, a stronger delivery system and stronger community empowerment can help to adapt technical interventions to specific contexts to make them more effective. The arrow pointing in both directions between the delivery system box and the community empowerment box indicates the potential for a stronger delivery system to empower communities and vice versa. Finally, the arrows pointing in both directions between delivery system box and the health outcomes box and also between the community empowerment box and the health outcomes box indicate the potential for positive health outcomes to further strengthen both the health system and community empowerment. This can occur by means of the increased enthusiasm and trust that arises from improvements in health. The framework emphasizes the influence of both programmatic and community-related factors on the effectiveness, scalability, and sustainability of interventions, all essential components of health outcomes. We believe that this framework is a helpful beginning point for future planning, implementation, evaluation, and research on improving child health in large-scale programs.

Table 5. Typology of Contextual Factors for High-Mortality, Resource-Poor Settings that Have Implications for the Implementation of CBPHC Interventions

Contextual Factor	Range of Extremes	
	More challenging	**Not as challenging**
Political environment	Unstable	Stable
	Authoritarian, centralized power[a]	Democratic, decentralized political power
Geographic environment	Sparsely populated, rural	Densely populated, urban
	Tropical wet climate	Dry, moderate climate
Socio-economic environment	Bare subsistence	Poor but minimum basic necessities present
	Food inadequate	Food adequate
	No infrastructure	Safe water, sanitation, and transport are readily available
	High degree of gender inequality	Women not oppressed relative to men
	High degree of inequality of household wealth	Minimal inequality of household wealth
Cultural environment	Highly traditional	Open-minded
Epidemiological environment	Extremely high under-5 mortality rate (200+)	Moderately high under-5 mortality rate (60+)
	High prevalence of HIV/AIDS	No HIV/AIDs
	High prevalence of malaria	No malaria
	Multiple biological and social factors are major contributors to under-5 mortality (e.g., pneumonia, diarrhea, malnutrition, vaccine preventable disease, orphanhood from HIV/AIDS, drought, poverty, lack of clean water and sanitation, illiteracy)	One disease (e.g., diarrhea) or one major risk factor (e.g. neonatal period) is the major component of under-5 mortality
Health care system environment and culture	Essentially no available modern health services	Basic health system available and functioning
	Local healers, drug sellers, TBAs dominant	Modern, formal health system dominant
	CHWs (connected to formal health system) not present	CHWs (connected to formal health system) present, well-trained, and well-supervised
	No supervision at periphery of formal health system	Strong supervision at periphery of formal health system
	High level of health care system dysfunction (absenteeism, corruption, lack of supplies, cultural barriers between providers and clients, etc.)	Low level of health care system dysfunction (absenteeism, corruption, lack of supplies, cultural barriers between providers and clients, etc.)

a. In some settings (such as Cuba), an authoritarian political system can achieve remarkable gains in child health if the regime has improving child health as one of its goals. Unfortunately, improving child health is not a priority in most authoritarian regimes.

Figure 4. A Conceptual Framework for Planning, Implementing and Evaluating the Effectiveness of Proven Technical Interventions in Routine Field Situations at Scale



Note: Triangles represent contextual factors, which are outlined in Table 5.

Promoting Community Empowerment

Promoting community empowerment to increase intervention effectiveness is not simple, but experience shows that the following questions must be addressed by both programs and communities:

- Will the community be a participating partner using its own resources to improve child health, or will the community simply continue as a target for activities defined by health professionals?
- Will the community create opportunities to participate in setting priorities and implementing program activities, or will the much more common practice continue in which communities let health professionals define all partnership roles in the health delivery system?

Activities through which communities can contribute to improving the effectiveness of child health interventions and that will at the same time be empowering for communities include the following:

- Involving local leadership in mobilizing a partnership between communities and "top-down" officials for planning and managing program activities and resources
- Clarifying respective value systems to help both health care workers and community members develop joint understanding and respect as they work together for benefits that are effective and equitable
- Involving women's groups to provide peer-to-peer education and home-based care while also involving men and mothers-in-law in creative ways to encourage community action for healthy behavior and appropriate health care utilization
- Adapting the health delivery system to local realities and culture, with integration of interventions and practices for maximizing acceptability and efficiency

- Enabling communities to collaborate with the health system not just in the initial stages of implementation but in a continuing relationship so that families feel ownership of the process and together they can establish a long-term partnership for robust and sustainable improvements in child health
- Registering vital events registration, identifying newborns who need to be enrolled in CBPHC services and programs, and tracking under-5 mortality rates at the local level

Developing a Better Understanding of When, How and to What Degree to Build Integrated Packages of Services and When, How and to What Degree to Focus on Highly Selective Approaches

The general debate about the relative advantages of vertical, highly selective approaches versus horizontal comprehensive participatory approaches is still with us. It has special relevance to the issue of how to accelerate the decline of under-5 mortality in priority settings. We need a framework which helps us to more clearly understand the merits of both and the potential advantages and disadvantages of each within specific contexts for improving the health of children. The term "diagonal approach" has been used to describe the implementation of highly cost-effective interventions for bridging clinics and homes (Sepulveda et al., 2006). Another approach is to recognize the need and validity of both vertical and horizontal approaches depending on the context and scope of action (Taylor and Jolly, 1988).

The paradigm developed by John Wyon[9] of the concept of public health as a three-legged stool has merit in this context. Improving the health of the public (or, more specifically in our case, of children) requires disease-oriented public health, services-oriented public health, and community-oriented public health. The goal of disease-oriented public health is to control a specific disease within a population; the goal of services-oriented public health is to ensure that those who need services receive them; and the goal of community-oriented public health is to work with communities to help them improve their health. Each of the three legs of public health is equally important if the mission of public health is to be as effective as possible. In some settings, depending on the local epidemiological profile, the current state of the health system, and the socio-economic context, emphasizing only a few targeted interventions may make the most sense while in other settings building capacity for a broader range of interventions may make more sense. Having a way to conceptualize the tradeoffs of these approaches as we give more attention to how to strengthen CBPHC for children will be important.

[9] John Wyon was Senior Lecturer at the Harvard University School of Public Health prior to this death in 2004. He is one of the intellectual architects of CBPHC because of his pioneering work in the community epidemiology of childhood illnesses (Wyon and Gordon, 1971; Wyon, 1997) and its influence on subsequent pioneering CBPHC programs.

Conclusions

Overall, the findings of this review provide strong scientific support for the following three conclusions:

1. When proven interventions are implemented at the community level by local trained and well-supervised health workers, coverage, impact, and equity can be favorably affected.
2. Under the right conditions, communities can become strong partners with established health delivery systems in improving the health of children.
3. Health programs can more effectively and sustainably improve the health of children by mobilizing the energy of local people for their own benefit.

When these findings are linked to the philosophical and political principle that most people in the modern world share, namely that local people have the right to exercise control over their health care, a virtually incontrovertible argument emerges for giving priority to CBPHC in areas with high child mortality and severe resource constraints.

There is no doubt that the specific child health interventions assessed in this review are efficacious under ideal field conditions. Whether packages of these interventions can sustain their effectiveness in priority countries under conditions in which local control and community empowerment are being promoted needs further study, especially when scaling up. These questions are challenging ones that will require considerably more experience tied to rigorous independent assessments in a variety of settings in order for genuine progress to occur.

Emphasizing expanded coverage of interventions that require a trained provider near the home to respond to serious and urgent childhood illness for which there are available proven interventions is important, as is the need to give priority to improving childhood nutrition through promotion of exclusive breastfeeding and appropriate complementary feeding. These interventions have particularly low coverage in priority countries, and they have great potential for reducing mortality.

Appropriate infant feeding is particularly important because there is no need to link health system-related commodities to these two interventions. Exclusive breastfeeding could be readily given priority as a vertical public health intervention in poor countries with weak health systems and high child mortality. As one recent review concluded, "interventions to promote exclusive breastfeeding have been estimated to have the potential to prevent 13% of all under-5 deaths in developing countries and are the single most important preventive intervention against child mortality" (Bhandari et al., 2008).

The impact which CBPHC has shown in such extremely poor and diverse countries such as Haiti, Cambodia, Afghanistan, and western Africa suggests that CBPHC should be a fundamental building block of health improvement in severely impoverished and fragile states. Many aspects of CBPHC can be sustained when a fragile health system breaks down, especially those around behavior change. Once a community-based outreach system is in place, it can continue to function

with minimal additional inputs from the formal health system, and further interventions can be added with relative ease.

The findings from the review strongly suggest that strengthening CBPHC is required for achievement of the Millennium Development Goal for child health. In order to do this, more field sites that can test different versions of CBPHC at scale are needed. These sites can then serve as "models in action" and as learning centers that other community members and health professionals can visit or learn about through rigorous assessments that are readily and publicly available.

More BRACs, Hôpital Albert Schweitzers, Jamkheds, Matlabs, Narangwals, Navrongos, and SEARCHs are needed to test and scale up effective integrated approaches to improving child health that can inform and inspire tomorrow's professional and community leaders. Right now, more external high-quality, independent, and transparent evaluations are needed of large-scale government programs, with the results shared not only through peer-reviewed journals but also through other communication channels to reach a wider audience, including government officials, policy makers, and communities. The recent assessments of conditional cash transfer programs in Mexico, Central America, and South America are examples of a promising new approach.

The growing scientific evidence that CBPHC can improve the health of children at scale at an affordable cost means that even the most impoverished societies have a powerful incentive to expand CBPHC programs. At the same time, this review makes it clear that high-quality field research and monitoring of mortality impact are fundamental. This will ensure progress in improving the health of children and the achievement of the Millennium Development Goal for children in the not-to-distant future.

For those interventions that have strong scientific evidence of efficacy but are not yet widely adopted, the challenge is to implement them more broadly and scale them up. Rigorous assessments are needed to guide adjustments in order to maintain effectiveness as the scale of implementation expands. The challenge then is widespread application of new knowledge at scale coupled with careful monitoring. Community-based approaches can then be integrated with all levels of health services.

The gap between what is actually taking place and what we know can be done to save the lives of the 9.2 million children dying each year is one of the world's most troubling moral crises. This report summarizes much of the evidence that community-based initiatives can fill the gap so as to reach those most in need. The challenge now is to apply this evidence at scale. With the engagement of local people improving their own health, health systems can more effectively serve the most impoverished.

CBPHC not only has the potential for improving the health of children, it also has the potential for creating the initial foundation of a health system with linkages to local primary health care facilities and referral hospitals. The poorer the community and the more fragile the health system, the greater the contribution CBPHC can make to improving the health of children. In all societies, mothers are the main "producers" of health for their children. Particularly in priority countries, mothers need access to knowledge, social support, and low-cost readily available services that CBPHC can provide in order to become better producers of health.

Scaling up vertical interventions was given overarching priority in the 1980s and 1990s. These interventions have lowered under-5 mortality and now serve as an entry point in beginning to build systems of more comprehensive primary health care. This review shows that adequate funding and technical support will be critical in order for CBPHC to succeed in realizing its potential in improving child health. Even more importantly, strong and rigorous evaluations of integrated packages of interventions at scale under varying conditions will make it possible to learn how CBPHC can be even more effective in improving the health of children. The long-term global priority continues to be Health for All as defined by the International Conference on Primary Health Care in 1978 (World Health Organization and UNICEF, 1978). By giving CBPHC emphasis as an approach for improving the health of children, a large stride will be taken to achieving Health for All.

This review confirms the need for bold action in expanding the commitment of governments, NGOs, and international organizations to give priority to CBPHC for improving the health of children. Application of these findings and careful assessments of cost-effective and sustainable CBPHC programs in routine settings at scale will provide more insight and opportunities for benefiting children in priority settings.

Recommendations

General Recommendations

I. Given the accumulation of strong evidence that community-based primary health care can improve child health and the urgent need to accelerate under-5 mortality reduction in high-mortality settings, it is recommended that the Expert Panel finalize a Declaration on the Importance of Community-based Primary Health Care for Improving Child Health in High-Mortality Settings to be published and disseminated widely. This would call on governments, donors, policy-makers, and NGOs to give priority to strengthening CBPHC programs through partnerships with communities, to implement priority child survival interventions through CBPHC approaches, and to expand funding for CBPHC in high-mortality priority countries.

2. The Panel should recommend that UNICEF establish an Independent Commission on Community-Based Primary Health Care and Child Health to (1) monitor progress in the implementation of CBPHC approaches in high-mortality settings to improve child health, (2) summarize and analyze new evidence regarding the effectiveness of CBPHC interventions and approaches to delivering these interventions at scale, and (3) make recommendations for accelerating the reduction in under-5 mortality in high-priority settings through CBPHC, particularly in specific priority countries.

Specific Recommendations

Continuing to Strengthen the Evidence of Community-Based Approaches for Improving Child Health

1. Increasing numbers of community-based intervention trials demonstrate mortality impact in carefully controlled field settings. These interventions have the potential to accelerate the reduction in the number of child deaths around the world.

   Recommendation: Donors and policy makers should give priority to expanding the coverage of efficacious community-based interventions which have been adapted to fit the local context and routine field conditions.

2. Integrated packages of community-based interventions have demonstrated evidence of long-term sustainability as well as effectiveness in routine field settings, but the evidence base is not as solid and is more difficult to establish than is the evidence regarding the short-term efficacy of individual interventions.

   Recommendation: There is a need for ongoing, long-term assessments of large-scale programs in routine field conditions with varying degrees of integration of services to determine optimal approaches to integration in varying contexts.

3. Communities have rarely been considered true partners in the implementation and evaluation of interventions to improve child health. Community-based programs have most commonly used the community as a passive recipient (i.e., a "target") rather than as a valued resource and partner with joint ownership of the process of program implementation. Increasing evidence demonstrates that community and women's empowerment can have a remarkable impact on the health of children.

   Recommendation: Field studies are needed to measure the causal influences of approaches which foster community partnerships. There is also a parallel need for understanding community and women's empowerment, and better methods are needed to establish causal relationships.

4. The evidence that community-based interventions can be effective in reducing neonatal mortality is strong, and major reductions in neonatal mortality are now possible using CBPHC.

   Recommendation: Efficacious home-based neonatal care interventions need to be given prominence in programs and tested at scale in routine field conditions, and they need to be tested as an element of a broader health care package.

5. There is growing evidence that indirect approaches which do not require a direct focus on health or nutrition can improve the health of children. These interventions include increasing the income of poor women by giving them access to micro-credit or direct cash transfer programs, empowering women in other ways (e.g., through education of women and girls and literacy training for women), and providing a social and political environment which ensures access to high-quality maternal and child health services as has been achieved at scale in Costa Rica, Cuba, Kerala, and Sri Lanka.

   Recommendation: Greater emphasis needs to be given to expanding the implementation of broad development approaches which have strong impacts on child health.

Common Strategies for Successful Community-based Programs

Within the formal health system (through outreach services provided by staff based at peripheral health facilities)

1. Outreach activities arising from facilities can provide essential education messages and key services for a high percentage of families with women of reproductive age, pregnant women, and young children. Holding "satellite clinics" where basic services such as immunizations, family planning, and prenatal care can be provided intermittently, usually monthly, at locations convenient to all households is one common approach for outreach. Routine systematic home visitation (i.e., to all homes periodically) is another common strategy. Such approaches promote equity by giving the poorest and most geographically isolated children and their mothers access to basic services.

2. Many successful community-based programs have been able to provide referral care as part of a systematic approach to health improvement. Such systems usually are built up slowly with long-term financial and technical support. Integration of CBPHC services with facility-based care, including hospital referral care, is a long-term priority which will also give legitimacy to CBPHC activities from the perspective of local people.

Within the community at the household level

3. Community-based health workers – either volunteer or paid – are needed to provide direct services, to build community capacity, and also to link the community with the health system. There is a wide variety of types of workers among programs which have demonstrated success.

4. Interventions to promote healthy behaviors must achieve high levels of coverage if they are going to be effective in reducing under-5 mortality in the population.

5. Priority needs to be given to community-case management of pneumonia, diarrhea, malaria, and neonatal sepsis and to promotion of exclusive breastfeeding and appropriate complementary feeding.

Linking top-down and bottom-up approaches

6. In many settings, NGOs have worked in coordination with government programs to expand coverage, often working directly with communities in ways that government programs have been unable to because of shortages of staff and logistical support in government programs.

7. Program effectiveness requires careful attention to the selection of lower-level staff, their training and supervision, and logistical support. These issues become critically important in scaling up program activities to larger populations, and they require a well-designed, ongoing stable support structure of professional leadership, long-term planning, and financial support.

   Recommendation: There needs to be continued efforts to strengthen the above-mentioned program elements through public-private collaboration and to test the cost-effectiveness of improvements to these program elements while at the same time adding new program elements, especially in the area of building community partnerships and promoting community and women's empowerment.

Noteworthy Gaps in Evidence Base

1. There is a need for more studies from Africa regarding the effectiveness of CBPHC in improving child health. Most of the evidence for this review has been obtained from studies in South Asia. There appears to be a gap in evidence for China, at least in the English literature.

   Recommendation: The effectiveness of community-based approaches needs to be independently assessed in a variety of African settings. Studies from outside of Africa which demonstrate the efficacy and effectiveness of interventions need to be replicated within priority African countries. Further search of the literature in China needs to be carried out to determine if stronger evidence is needed for CBPHC in China.

2. Given the rapid growth of urban low-income communities in developing countries and the fact that in many priority countries the number of people living in such communities is rapidly becoming larger than the number of people living in rural settings, there is a notable lack of studies on CBPHC in urban low-income settings.

   Recommendation: Model program sites and ongoing field research in urban low-income settings are needed.

3. The coverage and quality of certain community-based interventions of proven effectiveness (e.g., appropriate community-case management of pneumonia and malaria, home-based neonatal care, and handwashing) are not being monitored carefully.

   Recommendation: Coverage and quality of key community-based interventions and practices need to be assessed on a regular basis.

4. There are relatively few studies of the mortality impact of integrated CBPHC approaches which have been implemented at scale.

   Recommendation: There is a need for rigorous assessments of community-based integrated approaches for improving child health at large scale, including assessments of different methods of scaling up and different methods to improve cost-effectiveness.

5. Assessments of efforts to improve linkages between existing health programs and communities are urgently needed. Little documentation exists regarding the testing of different approaches to strengthen such linkages. Immunization programs have had a vast experience in addressing this issue, but little documentation about this is readily available.

   Recommendation: We need to seek out lessons learned from efforts to improve the linkages between health systems and communities and use these lessons in formulating stronger ties for improving the effectiveness of interventions requiring health system involvement.

6. The evidence of the effectiveness of large-scale community-based programs for improving growth and reducing mortality needs to be stronger.

   Recommendation: Future large-scale programs for improving child growth and for reducing under-5 mortality should be implemented with a rigorous independent evaluation of program effectiveness. Alternative approaches should also be tested, thereby making it possible to determine their relative effectiveness.

7. The impact of birth spacing on reducing child mortality is well-established, as is the impact of good maternity care on neonatal health. Strengthening community-based family planning and community-based maternity care in areas of high mortality and weak health systems can also have strong benefits for child health.

   Recommendation: Community-based approaches for improving child health need to be linked with community-based approaches to promote family planning and improved maternity care.

8. There are relatively few examples of successful programs with full descriptions of their context and operational features. Therefore, applying their methods becomes difficult.

   Recommendation: Standards need to be established for describing and defining contextual factors and program inputs, processes, outputs, and impacts that will make it possible to determine which program elements are critical to success in which contexts.

Overcoming Professional and Political Resistance to New Paradigms for Health Systems

1. There is a long history of resistance among organized health professional groups to delegate tasks downward even though this lowers costs for the poor and improves access to services. Rather than supporting strong community-based programs in high-mortality, resource-poor settings, these groups have missed opportunities for synergistic collaboration.

   Recommendation: Efforts will be needed to develop strategies arising from the evidence of this review for working productively with professional organizations and encouraging leading health professionals to engage in productive cooperation. They can learn how CBPHC assists governments and civil society in improving the health of the population and the health of children. Evidence regarding the effectiveness of CBPHC in improving child health needs to become an integral part of the educational curriculum of health professionals in high-mortality, resource-poor settings. Professionals must be encouraged to treat CHWs and community efforts with respect as they actively build local capacity.

2. There is a long history of indifference among major donor organizations, leading international health organizations and schools of public health, global health leaders, government leaders, politicians, and high-level government ministry of health officials in recognizing the benefits of involving communities as genuine partners in the production of good health.

   Recommendation: Urgent efforts will be needed to develop strategies building from the evidence of this review for working productively with these key decision-makers. Providing ample funding to research institutions to enable them to continue to expand the evidence regarding effectiveness and cost-benefits for investing in CBPHC will require a distinct change in current policies and practices.

Toward a Better Balance between Selective, Vertical Approaches and Integrated, Horizontal Approaches for Improving Child Health

The evidence from this review can help to build a more balanced approach and to move away from the policy debates arising in the 1980s leading to the view that comprehensive and selective approaches are competitive. They are in fact complementary. The "interim strategy" proposed so effectively three decades ago (Walsh and Warren, 1979) should be reconsidered. A vigorous strategy of strengthening local capacity to provide integrated, effective packages of key interventions through partnerships of health systems with communities should be promoted. Strengthening integrated community-based approaches to improving reproductive and child health can have the potential to ignite a second revolution for improving the health of mothers, newborns, and children and accelerating progress in achieving the Millennium Development Goals.

There is widespread agreement that vertical approaches have an important role to play for a few select priority conditions and interventions, particularly in extremely high-mortality settings. But there is also growing widespread agreement that massive increases in funding for vertical approaches without bolstering funding for other parts of the health system can harm health system functioning, especially when the system is fragile (Swanson et al., 2009). Building local capacity for broad and integrated local approaches can achieve sustainable health improvements that complement achievements of vertical approaches. Getting the right balance of investments among vertical programs, those that strengthen services more broadly, and those that promote community empowerment will be a challenge, but finding that balance will provide the best long-term benefits for children in high-mortality, resource-poor settings.

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Daniel Taylor

Study Protocol for Review

Community-Based Primary Health Care Working Group
International Health Section, American Public Health Association

Henry Perry and Paul Freeman
2 August 2006

Rationale

No recent systematic reviews of the effectiveness of community-based primary health care (CBPHC) on improving child health have been carried out. The number of recent studies demonstrating the potential of this approach is growing, and interest in CBPHC is on the rise. Now is an opportune time to review the available evidence regarding the effectiveness of CBPHC, to draw conclusions regarding the findings from this review, and to suggest next steps in research, policy and program implementation. It appears that strengthening CBPHC is one possible approach to reaching the Millennium Development Goals in health. If the findings from the systematic review confirm this, then there will be perhaps more momentum in this direction in the future. The questions we propose to address are:

- How strong is the scientific evidence that CBPHC can improve the health of children at the population level and sustain that improvement?
- What conditions (including those within the local health system itself) must be in place in order for community-based interventions to be effective?
- What are the most effective community-based approaches for promoting key behavior changes to improve child health?
- What lessons can be drawn from both successful and unsuccessful experiences?
- What additional research is needed?
- How can successful community-based approaches for improving child health be scaled up to regional and national levels within the context of severe financial and human resource constraints?
- What are the implications for regional, national, and global health policy, for program implementation, and for donors?

Definition of Terms

The working definition of CBPHC that we are beginning with is the following:

- For the purposes of this review, we define CBPHC in a rather broad fashion. CBPHC is a process through which health programs and communities work together to improve health and control disease. CBPHC includes the promotion of key behaviors at the household level as well as the provision of health care and health services outside of static facilities at the community level. CBPHC can (and of course should) connect to existing health services, health programs, and health care provided at static facilities (including health centers and hospitals) and be closely integrated with them.

- CBPHC involves improving the health of a geographically defined population through outreach beyond the walls of static health facilities. CBPHC does not include health care provided at a static facility unless there is community involvement or outreach and services beyond the facility.

- CBPHC also includes multi-sectoral approaches to health improvement beyond the provision of health services per se, including programs which seek to improve (directly or indirectly) education, income, nutrition, living standards, and empowerment.

- CBPHC programs may or may not be in collaboration with governmental or private health care programs; they may be either comprehensive in scope or highly selective; and they may or may not be part of a program which includes the provision of services at fixed facilities.

  CBPHC includes the following three different types of interventions:

  1. Communications with individuals, families, and communities to improve key practices
  2. Social mobilization and community involvement for planning, delivering, and using health services
  3. Provision of health care in the community, including preventive services (e.g., immunizations) or curative services (e.g., community-based treatment of pneumonia)

We will include measures of child health and close determinants of child health as outcome measures. Among these are the following:

1. Child mortality
2. Serious, life-threatening morbidity (e.g., pneumonia, diarrhea, malaria, low-birth-weight)
3. Serious but non-life threatening morbidity (e.g., trachoma, acute upper respiratory infection, conjunctivitis)
4. Nutritional status (malnutrition as defined by anthropometric indicators and by micro-nutrient status)
5. Key behaviors that have strong scientific evidence supporting their influence on child survival and child health (including those cited by the two recent *Lancet* series on child survival and neonatal survival):
   a. the proportion of infants exclusively breastfeeding in the first 6 months of life and the proportion of infants 6-11 months of age who are breastfeeding
   b. the proportion of infants 6-11 months of age who are receiving appropriate complementary feeding
   c. the proportion of mothers of young children with appropriate hand-washing practices

d. the proportion of households with young children where safe water and adequate sanitation are present
e. proportion of cases of childhood diarrhea for which oral rehydration fluid was provided
f. proportion of children that sleep under insecticide-treated bednets
g. proportion of deliveries that are "clean"

6. Key health service interventions that influence child health:

   a. tetanus toxoid immunization coverage (among women of reproductive age)
   b. measles immunization coverage (among children)
   c. Hib immunization coverage (among children)
   d. diagnosis and effectiveness of antibiotics for treatment of childhood pneumonia
   e. diagnosis and effectiveness of case management of childhood malaria
   f. diagnosis and effectiveness of antibiotics for treatment of childhood dysentery
   g. diagnosis and effectiveness of case management for neonatal sepsis
   h. coverage and quality of programs to prevent maternal-to-child transmission of HIV infection
   i. coverage and quality of programs to detect and treat maternal syphilis
   j. coverage with vitamin A supplementation
   k. coverage with zinc supplementation/treatment
   l. coverage with anti-malarial intermittent preventive treatment in pregnancy
   m. coverage of family planning services (contraceptive prevalence)

As part of the review, we will include issues related to the measurement of community participation and community empowerment, using diverse tools from the behavioral sciences.

Document Search

We will obtain information through the following methods:

1. A systematic search of major databases including PubMed, POPLINE, Cochran Reviews, and CABI Publishing Database Subsets. The search terms used for this search include (in addition to search terms for the specific outcomes mentioned above):

   - behavior change
   - child health
   - child mortality
   - community-based nutrition programs
   - community-based primary health care
   - community-based programs
   - community empowerment
   - community groups
   - community health
   - community health workers
   - community involvement
   - community participation
   - community programs
   - developing countries
   - infant mortality
   - intervention
   - neonatal mortality
   - primary health care
   - social capital
   - trial
   - women's empowerment
   - women's groups

These terms will be used in various combinations to identify potential references. A few examples are the following:

- child health and community health and developing countries
- child mortality and community-based primary health care
- women's groups and neonatal mortality
- exclusive breastfeeding and infant mortality and community health

2. A review of sources cited in studies obtained through a systematic search of databases, and a review of reviews (such as the recent *Lancet* series on neonatal survival and child survival).

3. Requests to knowledgeable professionals and to organizations working in the field of global public health for nominations of programs which should be included in the review.

4. Finally, the references cited in the *Lancet* series on child survival and neonatal survival (which provide the evidence that the interventions are effective in reducing mortality) will be reviewed to ascertain what information regarding community processes is available.

Methods for inclusion of evidence for the review

The focus of our work will be on highlighting evidence from two types of projects/programs/studies. First, we will review assessments of programs with multiple interventions which have built strong and long-standing community partnerships in typical field settings. Secondly, we will review assessments of individual interventions (many of which have been implemented over a shorter period of time) but which give a central role to the community.

Selection of documents for inclusion

Each document produced by the above search procedures will be reviewed independently by two reviewers to see whether it should be included in the study or not. If there is disagreement between the two initial reviewers, Henry Perry, Paul Freeman or Sundeep Gupta will make a final decision in case of a disagreement.

Criteria for inclusion are that the document assesses whether or not an intervention defined as CBPHC according to the above definition leads to improvements in child health (as defined above). We will be particularly concerned about what actually takes place at the community level and the relationship between the CBPHC program and the community and the community's involvement in the process. We will be less concerned with the issue of whether a specific technical intervention is effective under ideal or research conditions and more concerned with how effective interventions can be applied in routine field conditions with limited resources, how the coverage of effective interventions can be expanded, and how mortality impacts can be achieved.

Information collection from each document chosen

Each document chosen will be entered into an Endnotes database.

A standard Data Extraction Form has been developed. This form has been designed to:

- Collect technical information about the type and design characteristics of each study as well as all outcomes and findings
- Collect information that will make it possible to answer all of the study questions
- Enable a review of the quality of each study to be made

The data collection forms include:

- An initial review form

  This will be used by two independent reviewers to extract the information described above as well as to make a judgment about the technical quality of each study, the level of community participation, and associated contextual issues including the nature of the relationship between the health program and the community.

- A final review form

  This form will be used by a third reviewer who will examine the two initial review forms provided by the two independent reviewers above, summarize and convert their entries (using standard codes where appropriate) into a form that can readily be entered into an EPI Info database, and resolve any issues arising from disagreements among the initial two reviews.

Data analysis and write up

Data will be analyzed and written up in a five-stage process.

1. As described, the initial stage will involve reviewing each of the completed Data Extraction Forms from each of the two reviewers for each project/program/study and consolidating this information into a single report.

2. In the second stage, the EPI INFO data file containing all of the reviewed articles will be analyzed and summarized, with a statistical analysis of the data (number of articles, types of articles, quality of the data, and so forth).

3. In the third stage, the staff (Henry Perry, Paul Freeman, and Sundeep Gupta) will prepare a written summary and then share this report with the Expert Review Panel.

4. In the fourth stage, the Expert Review Panel will review this report and provide feedback to the staff regarding what it sees as the key findings, the major recommendations, and the implications for policy and future research.

5. In the fifth stage, the staff will take this feedback from the Expert Review Panel and prepare a final report as well as specific articles for submission to scientific journals.

For the analysis, we will use the same categorization of types of interventions that were used in the *Lancet* series, namely (1) facility-based clinical care, (2) outreach, or population-oriented services, and (3) family-community care.

At some point in this process, we will consider obtaining opinions from key informants regarding the conditions within the health system and within the community which are critical for achieving effectiveness in reducing child mortality. In addition, we will plan to carry out a "review of the reviews" that have been done and seem relevant to what we are doing here, including the *Lancet* reviews, the review of family and community practices by Hill, Kirkwood, and Edmond, the review of child mortality interventions in Africa by Ewbank and Gribble, and recent reviews of community health workers (e.g., that by Gilroy and Winch and by Lehman, Friedman, and Sanders).